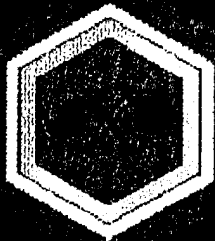


EDGEWOOD RDE CENTER



1996
DEPARTMENT
OF THE ARMY
RESEARCH AND
DEVELOPMENT
ORGANIZATION
OF THE YEAR
AND EXCELLENCE
AWARD



Providing
World-Class
Technology
and
Equipment
to the
Soldier
in the
Field. . .
M94 Bio Standoff
Det Sys
FOX
ACADA
M56, M58,
Smoke Generator
M81 Smoke Grenade



19960702 039

Aberdeen Proving Ground, Maryland

March 1996

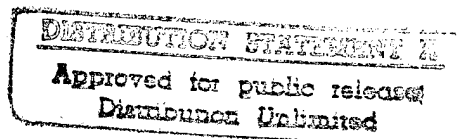
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**1996
DEPARTMENT OF THE ARMY
RESEARCH AND DEVELOPMENT ORGANIZATION (RDO) OF THE YEAR
AND EXCELLENCE AWARDS**

Reference Army Regulation (AR) 672-305, Army Research and Development Laboratory Awards

Based on the referenced AR, we submitted this nomination package. The criteria for evaluation requires that the nominating activity provide, within the 25-page nomination package, all the information needed by an evaluator to score the ranking factors. Throughout this document, we show parenthetically the requirement and the point value following the subsection heading. Increased emphasis has been placed on customer satisfaction in the scoring process.



EDGEWOOD RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

I am proud to present this annual review of the Edgewood Research, Development and Engineering Center for Fiscal Year 95. We have made enormous progress in meeting some of our biggest challenges and passing critical milestones toward achieving our strategic vision and plan. At no time in my 33 years of Federal service have there been so many activities going on that could severely impact on our RDA business of CBDCOM and throughout AMC – among which are functional area assessments, continued downsizing, competition for mission dollars, and privatization. Yet, I am excited about Edgewood's future and the challenges we face, knowing we have embarked on an innovative business strategy that is focused on firm commitment to excellent products for our customers.

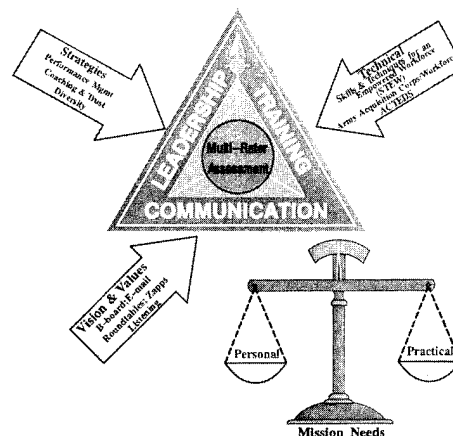
To understand the environment in which we will be operating in the next few years and into the next century, we must acknowledge that we are in an Army of transition and radical change. To meet this challenge, Edgewood continues *to invest in key enabling technologies* such as the development of antibodies using recombinant DNA techniques to allow for rapid response to new threat agents, surge production using scale-up fermentation and drastically reduce costs compared to existing technology (see page 4).

Balancing near term with far term readiness is a great challenge. However, our workforce has already demonstrated their innovative nature and ability to visualize outcomes by designing, developing, and fielding in less than 2 years the world's first biological detection system, which is pre-configured to take advantage of future technology upgrades while enhancing survivability of American troops on the biological warfare battlefield (see page 6).

Partnering with industry to save money will be key to efficiency and economy. A new CRDA will result in electro-optical devices for detection of CB weapons and for monitoring for toxic, hazardous chemicals and pollutants; our industrial partner is focusing on hardware development while Edgewood is undertaking detection algorithm development and testing (see page 9).

Finally, we must continually *provide visible and committed leadership* for our people. This year we instituted an Integrated Personnel Professional Development System that interweaves our technical mission with interpersonal competencies and professional growth. At Edgewood employees collaborate with their leaders to develop career road maps to include training and coaching.

I look forward to another successful year at the Edgewood Center, looking at the unknowns and challenges as opportunities to do good things for our people and to improve quality and productivity in efficient and economic ways.



JOSEPH J. VERVIER
Technical Director

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This document was prepared in response to a call for nominations for the Assistant Secretary of the Army (Research, Development and Acquisition) Organization of the Year Excellence Awards. Inquiries on information in this document should be directed to:

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I. ACCOMPLISHMENTS AND IMPACT - 40 points

My first priority in the conduct of our business is the quality of our products and services. Satisfaction of our customers' requirements define quality for us. We must seek to exceed their requirements in the present and anticipate their needs for the future. Our quest for greater customer satisfaction, our concern for worker safety, our stewardship of the environment, and our partnership with our community will all be enhanced by our commitment to a culture of empowerment throughout the Enterprise.

Joseph J. Vervier, ERDEC Technical Director

I.1 *Customer Satisfaction (clear indication of customer satisfaction as documented by letters of satisfaction and commitments of continued support for efforts - 10 points).*

In 1992, our leaders made a solid commitment to the redesign of the RDE Center into a world class organization to proactively manage the nation's chemical and biological programs and to anticipate and meet the requirements of our customers in the 21st Century.

During FY95, Mr. Vervier, in his role as RDA Business Manager for the Chemical and Biological Defense Command, made the strategic decision to include his customers and suppliers into the structure and processes owned by the Center. Through this unique arrangement, **we became the Edgewood Enterprise**. Today, the Enterprise is comprised of the Edgewood RDE Center, the Project Manager for Nuclear, Biological and Chemical (NBC) Defense Systems, the Product Manager for Smoke/Obscurants, the Program Director for Biological Defense Systems, and business management, legal, and procurement elements of CBDCOM. Mr. Vervier and his Corporate Board have replaced outmoded management practices with the management criteria of the **Malcolm Baldrige National Quality Award as the framework** to achieve world-class quality in the organization.

Creation of the Enterprise effectively brought our major customers into Enterprise planning and

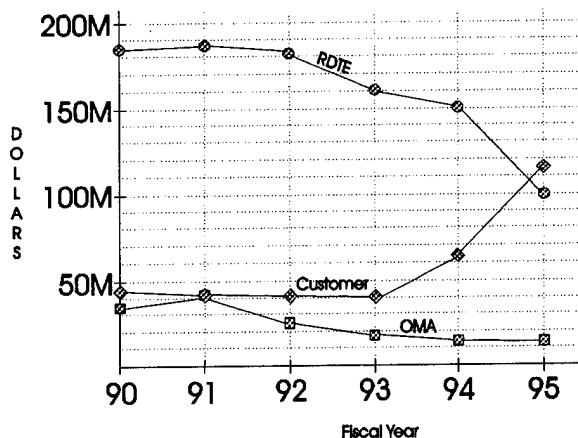
deliberations as members of the Corporate Board. Senior leaders in the Enterprise deliberately maintain a high profile and make themselves visible to our external customers by correspondence, publication and, most importantly, by an aggressive program of periodic direct contact. This frequent contact between customers and senior leadership builds and reinforces open communication about shared concerns and expectations.

We negotiate requirements for products and services directly with each customer. We take great pride in exceeding their requirements and make every effort to do so. We always put the safety, health, and welfare of our employees and the protection of the environment first, while delivering these products and services.

As the nation's leading resource for NBC defense technology and product development, our products and services have application in both the government and commercial sectors. We rely on approximately 100 research and development, 25 production, and 100 service suppliers from private businesses and government plus about 20 academic institutions. Fewer than 10 suppliers are qualified for working with chemical agents nationwide.

As with other organizations throughout DoD, we are faced with continued reductions in RDT&E and OMA program funding. As shown in the following figure, this downward trend is severe. In response to this financial challenge and our interest in keeping our work force viable and productive, we are leveraging our core competencies by obtaining

increased customer-based funds. In FY95, there was a steep upward trend in customer funding; an indication that our customers value the products and services we provide.



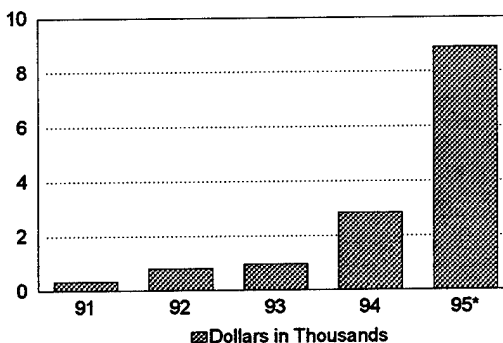
Funding Profile

We recently developed *customer service standards* that describe our current level of performance and the behaviors to which we aspire. We are communicating them throughout the Enterprise and discussing the impact they will have on our ability to exceed our customers' requirements. Our intent is to exceed our benchmark with ARDEC. Customer programs and some examples of their satisfaction follow:

- The intentional release of nerve agent in the Tokyo subway system last March brought a new anxiety to the forefront of this nation's consciousness—that of chemical and biological terrorism. But here at Edgewood, records confirm that the Army has been quietly planning for what Rear Adm. Frank E. Young calls the "unthinkable" for more than 30 years. Recently, CBDCOM's work with the U.S. Public Health Service brought Young, who is director of the Office of Emergency Preparedness, to Edgewood to honor **James A. Genovese and his counterterrorism team** for their "outstanding leadership and dedication" in support of the Public Health Service in U.S. Government emergency preparedness programs and operations.

- The Lightweight Standoff Chemical Agent Detector successfully completed initial operational testing aboard the Navy's Pioneer Unmanned Aerial Vehicle. This test represented the first real-time, wide-area chemical reconnaissance capability and the first operational standoff capability from an aerial platform. Mr. Kirkman Phelps, Mr. William Loerop, Mr. John Dittillo, and Mr. Robert Gross received the **Marine Corps Meritorious Civilian Service Award** for their outstanding achievements in the design, development, and evaluation of this Detector.

- Public Law 102-484, October 1992, mandated that the Army readdress the use of incineration at chemical demilitarization sites. The mandate has forced the Chemical Demilitarization and Remediation Agency, one of our customers, to modify the chemical demilitarization preferred process of incineration. The Edgewood Center was the laboratory of choice to perform this program. To meet our customers' needs, a massive team of full time and part time engineers and scientists, along with several contract suppliers, are reengineering the chemical destruction process; this customer satisfaction is shown in the following chart in the form of increased funding.

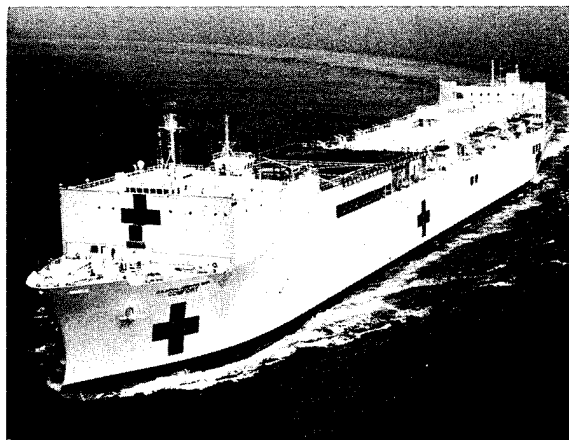


*As of 30 Jun 95

Chemical Demilitarization and Remediation Activity

- Our Armored Systems Modernization Team developed a Pressure Swing Adsorption NBC filtration predictive mathematical model predicts a

system's performance against a particular threat. The Comanche helicopter development program is experiencing performance problems with the PSA portion of their environmental control system. Using our model, we predicted PSA performance under Comanche operating conditions. The test results represent the first time that a performance prediction capability was demonstrated for a PSA-based NBC filtration system. The PM asked us to assist the Comanche prime contractor. The Deputy PM for Comanche said that this was the first time he had observed tech base efforts being applied to a development system.



Hospital Ship USNS Comfort

- Under Dugway Proving Ground's DO49 Program, our Ventilation Kinetics Team identified modifications to the decontamination station on the Navy's Hospital Ship USNS Comfort. The Military Sealift Command has taken action to implement the recommended, which are expected to be completed in March, 12 months after the project was initiated.

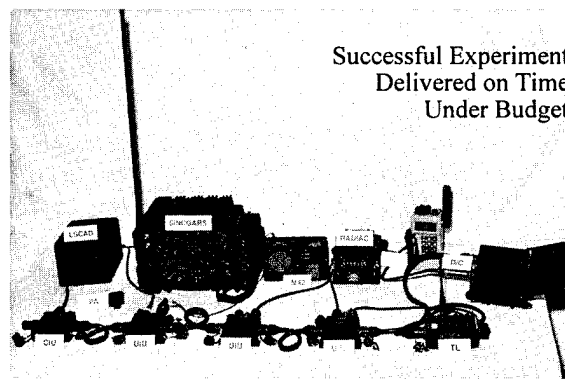
- The Air Force recently recognized Mr. Gabriel Ramos for his contributions to their CB Hardened Air Transportable Hospital program.

- The Biological Integrated Detection System team presented Mr. Peter J. Stopa with an award for his efforts in helping to expeditiously field the BIDS. Specifically, his efforts in the flow cytometry and microluminescence technology

resulted in a continuation of customer funding in excess of \$400K.

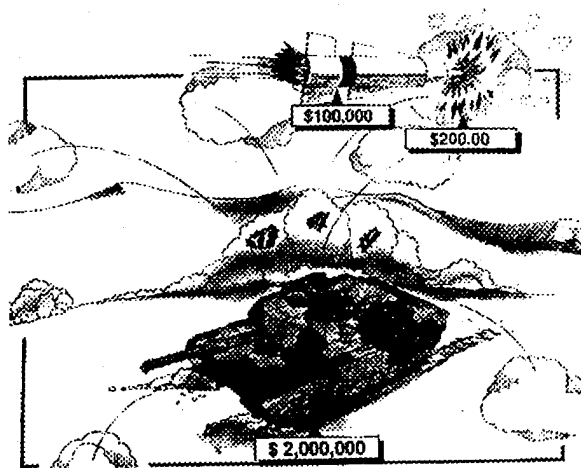
I.2 *Meeting Assigned Objectives (Measurable evidence of having met milestones as documented through STOs, ATDs and other contractual agreements - 10 points)* Several of our projects are discussed below:

Warrior Focus Advanced Warfighting Experiment – Demonstrated integration of our Lightweight Standoff Chemical Agent Detector, Multipurpose Integrated Chemical Agent Detector, and the Chemical School's Automated NBC Information System into a CB detection and warning system as part of the digital battlefield concept. This cooperative effort with the Chemical School and the Dismounted Battle Lab provided an opportunity to integrate our NBC technologies and products into the Warfighter's environment.



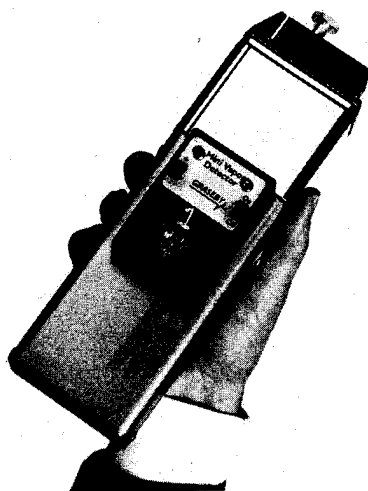
Integrated Biodetection Advanced Technology Demonstration – Enhances DoD's capability to detect, identify, and warn all Service members on the battlefield against biological agent attacks. Integration of state-of-the-art detection technologies will be linked with communications and warning systems to provide a battlefield biological detection and warning system currently not available. An enhanced detection and identification device with improved sensitivity, selectivity, specificity and extended range of agents will be demonstrated for application in the Joint Service Biological Point Detection System Block II Program. Prototype technologies are under investigation for application

to a Biological Aerosol Mapping System. Supports: Joint Biological Point Detection System and the Joint Biological Standoff Detector System.



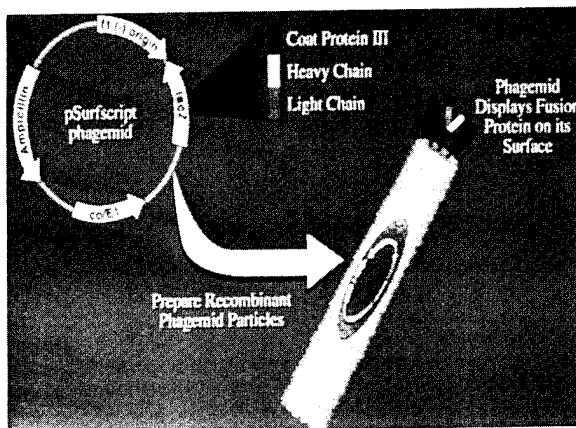
MMW Obscurants: can't be beat at any cost!

Millimeter Wave Screening STO – in FY95 demonstrated a screening material that degrades to non-harmful residues after completing its intended mission. Environmental concerns have dramatically reduced training with chaff and obscurants, and the Army, Navy, and Air Force are searching for solutions to this dilemma. The technology we developed under this STO provides a solution.



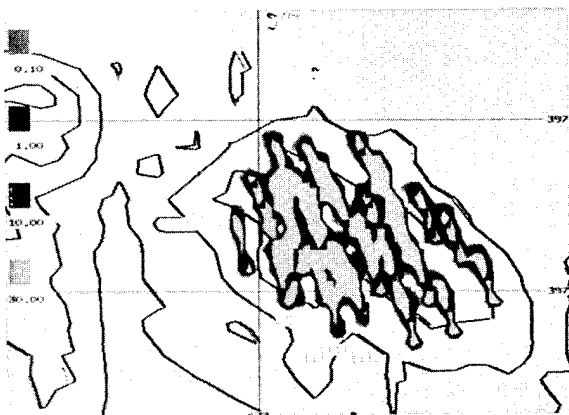
Joint Service Chemical Miniature Agent Detector STO – Technology bread board delivered one year ahead of schedule, allowing for creation of joint test program in FY96. This technology will

allow the individual to be equipped with a lightweight chemical agent detector. Supports: 21st Century Land Warrior and the GEN II Soldier ATD.



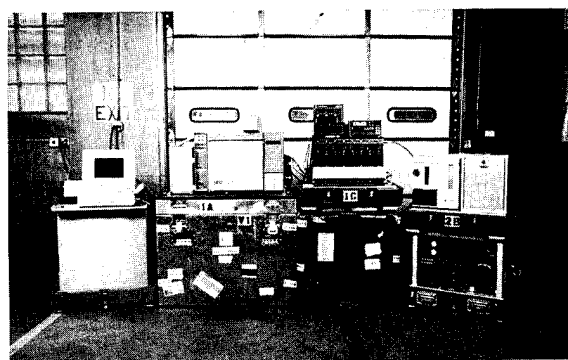
Antibody Manufacturing Development STO – focuses on applying the new tools of molecular immunology to the production of antibodies which can detect biological agents. The technology involves inserting a gene for an antibody into a bacterium and allowing the bacteria to produce antibodies. This technology dramatically reduces production costs because bacteria are cheap and easy to grow in large quantities using standard fermentation technology. It is now possible to completely by-pass animal use in antibody development by constructing synthetic genetic “super libraries,” which completely mimic the human immune repertoire, allowing rapid selection from billions of possible antibodies. The Enterprise and the Scripps Research Institute are currently working on this process.

We had several ongoing Soldier Enhancement Programs (SEPs). The XM998 40MM Smoke Round was delivered to SEP on schedule. Another proposal, which is looking at adapting the XM45 Aircrew Mask for use by Infantry and Armor Crews, was rated as the #1 priority out of 12 approved SEPs.



Distributed Interactive Simulation (DIS) forms the keystone of the DoD Advanced Modeling and Simulation Program. Our capability delivered simulators to support the development of CB defense equipment.

In FY95, our **Modular Laboratory** was used as a training tool for a variety of different customer oriented programs.

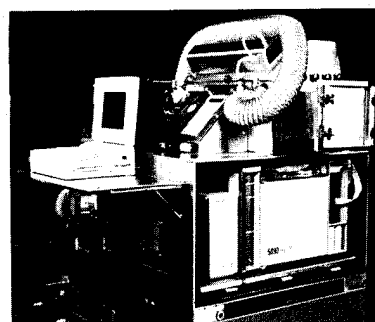


Modular Laboratory

Currently, one of the four existing labs is in Iraq where it is being used for the analysis of samples collected around dual purpose Iraqi sites, providing a continuous chemical weapons monitoring presence. AMC Treaty Laboratory personnel installed the system and operated it in Baghdad for

6 months. We continue to train new analysts in the operation and maintenance of the Mod Lab prior to their deployment to Iraq.

The new Super Toxic Analytical Glovebox System (STAGS) has been used to characterize neat chemical agent in the field. The STAGS, which is a ruggedized integration of sophisticated analytical equipment with engineering controls was designed, fabricated and fielded within 1 year. This system, which was funded by the Alternative Technologies to Incineration Team provides an innovative alternative to the transport of super toxic material to a laboratory for analyses. The STAGS offers near real time analytical results at substantial cost savings.



STAGS

1.3 Technology Transitions (ATDs or STOs transitioned to development programs. Technologies developed and inserted into ATDs or STOs - 5 points).

An active participant in the Federal Laboratory Consortium, Edgewood's technology transfer opportunities are now available on our world wide web site which had over 40,000 hits since October.

The M21 Interface Data Acquisition Software package was requested for technology transfer by four organizations. The package was designed, fabricated, and implemented by several Center employees RDEC. E.A. Howden's assistance at Night Vision Electro-Optics Laboratory brought this package to completion.

Two tech base programs transitioned to Concept Demonstration and Validation. The LSCAD provides passive infrared imaging of chemical agent

clouds from moving platforms from distances of several kilometers. The **Sorbent Decontaminant** provides the individual soldier with a replacement for DS2 for use in Immediate Decontamination Operations.

Two tech base programs transitioned to SEPs: the Enhanced Incendiary Grenade and the Mid-Sized Riot Control Dispenser.

Several discoveries in the basic research were transferred to later stages of development or direct application. Advancements in the DNA probe-based fluorescent detection of bacilli using magnetic bead technology was transferred to the exploratory program for further refinement. An algorithm was developed to reduce errors in the commercially available Aerodynamic Particle Sizer and the

manufacturer has begun marketing similar new software. A program written for an ILIR project on neural network time dependent analysis of coding data has been incorporated into the detection algorithm for the CBMS development.

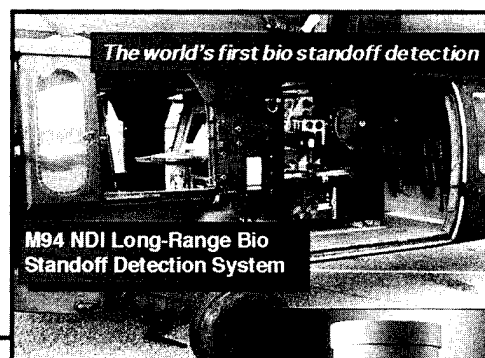
Through an agreement with the National Institute on Drug Abuse, we transferred over 3,000 samples (many are one-of-a-kind) to be used by the Institute in research projects for medication development.

A Strategic Technology Applications Team was established to evaluate and assess Edgewood Center-developed technologies to determine the relative commercial potential of these technologies (and patents).

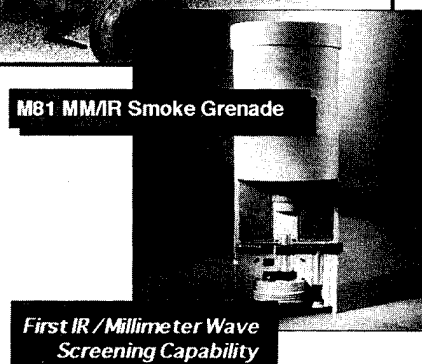
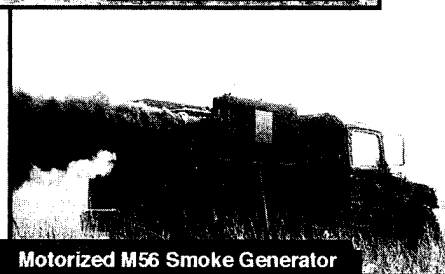
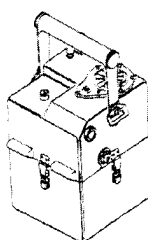
TYPE CLASSIFICATIONS IN FY95



Type-classified, limited procurement early in 1995, and recently TC-Standard, the Biological Integrated Detection System provides first time capability for limiting the effects of large area biological warfare attacks. This very successful program is characterized by the rapid transition from concept to field in 2 years, using the NDI approach, and provides for future capabilities as we discover and develop new technologies.



Generic ACADA -
Greatly improved
chemical agent
detector



I.4 Breakthroughs (Major discovery in overcoming a technology barrier within assigned mission - 5 points).

A patent by William A. Adams on **Multifuel Combustion Engine** enables fielded M157 smoke generator systems to operate on lower volatility fuels, such as diesel and JP-8, eliminating the need to use mogas for the smoke generators.

Drs. Valdes (Edgewood Center), Emanuel and Eldefrawi (University of Maryland), and CDR Burans (Naval Medical Research Institute) developed a **recombinant antibody against botulinum neurotoxin**. This is the **first antibody that is specific for the neurotoxin**, rather than the hemagglutinin complex, and has significant utility for medical diagnostics and food testing. A **provisional patent application has been filed**.

Dr. Eldefrawi, Dr. Valdes, and Ms. Christine Savage discovered a significant difference in response by recombinant human and eel acetylcholinesterases (AChE) to organophosphorous pesticides (OP). This is important because the eel

AChE has been the standard model of OP effects on which toxicity extrapolations are based.

Filtration of samples prior to analysis on the Model 4700 Microluminometer could remove interfering substances, resulting in application of this technology for waste water monitoring and in food plants. The 3550 uses liquid reagents, which require refrigeration and storage. Since the 4700 uses the dry ticket, it allows the user freedom from the laboratory.

Skunk Works projects are an attempt to *break the mold* of the typical acquisition cycle to encourage innovative solutions to difficult problems. Prototypes of systems/concepts are to be demonstrated in 12 to 18 months. We had four significant successes in FY95.

- A collaborative effort with Westinghouse Corporation was to develop a battery-operated, hand-held toxin detector for agents of biological origin. A **latex agglutination assay for Staphylococcus enterotoxin B** was developed; the assay was tested in individual reader cards.

- Another project placed a **biological sampler on a small, remotely piloted aircraft to grab a sample of a biological aerosol**. This effort was **successfully demonstrated at the Joint Field Trials-II at Dugway Proving Ground in September**.

- The third effort was to **develop a prototype Radiac (nuclear radiation detectors) and Chemical Agent Monitor training device using Global Positioning System receivers and a palm-top computer**. Software was written to convert current position on the ground to a simulated chemical or radiological reading based on a previously input position for "Ground Zero;" **both systems were successfully tested**. Another prototype was built using the same technique to simulate the mass spectrometer in the FOX Vehicle. The prototypes were demonstrated to the Chemical School.

- The fourth effort was to develop a detector to record and retain sufficient information of potential exposures to chemical agents. This need was an outcome of the significant number of soldiers complaining of illnesses after serving overseas during Operation Desert Storm. The prototype under development at the Edgewood Center is the **Miniature Ion Mobility Spectrometer with Data Archival**. It consists of the Ion Mobility Spectrometer, an HP palm-top computer, and PCMCIA FlashDisk. **The technology is being transferred for use in the Lightweight Chemical Detector STO.**

1.5 Leveraging of Industry, Academia, and Service/Agencies (Measurable instances where organization latched-up with technical counterparts outside of DA to:)

1.5a Spin-ons (Take advantage of other organization's mission and investment to enhance own - 2 points).

A Texas Research Institute SBIR, coordinated at the Edgewood Center, was to develop a kit for detection of defects in impermeable protective suits, gloves,

and shelters for use at storage depots, chambers, and clean-up sites. An off-shoot of the SBIR was a **kit for assisting in detection of complete decontamination of suits and shelters**. The kit is trade-marked as **DECON-CHECK**.

As an outcome of research efforts with the Meat Animal Research Center, U.S. Department of Agriculture, Clay Center, NE, we hope to **apply their meat inspection techniques to biological field analysis**.

A graduate study team in the University of Baltimore's *Lab to Market Program* needed a model to help market a syringe cover. A local medical equipment manufacturer was interested in the item. Under a **CRDA with the University of Maryland Technology Extension Service**, we provided computer-generated drawings and a breadboard prototype.

A CRDA with Xacton Corporation will develop new equipment and electro-optical devices for detection of CB agents or weapons on the battlefield; monitoring of conditions associated with counterproliferation; detection of toxic, hazardous chemicals at waste sites or spills; detection or monitoring of pollutants from industrial operations; and detection and identification of chemical constituents in and around chemical plants or refineries for purposes of safety or process control. **The Xacton Corporation will focus on developing the detector; we will focus on the detection algorithm and testing.**

The annual meeting of the State University of New York's Center for Biosurfaces was hosted by Edgewood and chaired by Dr. Valdes (Edgewood Center) and Dr. Robert Baier (Center for Biosurfaces). The Center for Biosurfaces is a participant in the National Science Foundation's Industry/University Cooperative Research Centers programs and is a consortium of industrial and academic partners who are pursuing research and product development in biomaterials, bioprocess development, and surface chemistry. **Dr. Valdes is**

the sole government participant, and is also a member of the Executive Advisory Board.

Last year's **Advance Planning Briefing to Industry (APBI)** was considerably different in that it was advertised as a DoD Chemical Biological APBI and reflected the new joint service atmosphere within the CB defense community. Over 400 people attended this APBI.

1.5b. *Spin-offs (Hand-off to other Service or commercial organizations to enhance their mission and investment as value-added - 2 points).*

Mr. Peter J. Stopa was contacted by Dr. Richard Raybourne, Food Safety Service, FDA, to jointly study **application of flow cytometry to tainted foods**; a short study was done using tainted hamburger.

The U.S. Army Medical Institute of Infectious Diseases contacted us about the use of flow cytometry technology as a **test system for anthrax**; the data was presented at the Anthrax Conference in Winchester, UK.

The University of Baltimore selected two Center products for evaluation in their ***From Lab to Market Program*** Opportunity Analysis course during the spring and fall semesters. The products are a **Protective Sample Container**, developed to transport toxic chemical samples on commercial airlines; and **encapsulation technology**, which has potential for **protecting crops from frost and freezing**.

Training with chaff and obscurants has been dramatically reduced because of environmental concerns. Processes developed for our STO on Millimeter Wave Screening were used to **modify standard Navy chaff rounds to prevent the accumulation of conductive fibers in training areas**.

We are working with the Center for Health Promotion and Preventive Medicine on Criteria Documents for several chemical warfare agents. These documents will provide the **"health standards" for many chemical demilitarization operations and human toxicity estimates for low-level exposures for the soldier, occupational worker, and the general population.**

Under a CRDA with the Maryland Biotechnology Institute, we focus on cloning recombinant antibodies from genetic libraries, and the Institute will develop scale-up biomanufacturing processes. **The world's first recombinant antibody against botulinum neurotoxin has been cloned and is being manufactured.**

An agreement with two academic institutions to conduct a joint program to study thermography, using a very sensitive thermal imager developed at Edgewood, to determine its possible use as a **medical diagnostic tool** (e.g., to detect and monitor breast cancer).

An agreement with a small business in Massachusetts to **design and develop new equipment and electro-optical devices to detect CB agents**, detect hazardous chemicals, monitor pollutants, and determine chemical constituents in industrial operations; an agreement with an academic institution to conduct a joint research project in which **plasma/flame spray technology will be employed to study the generation of particles**, the surface hardening of polymer composites, and the development of electrically conductive adhesives.

1.6 *Lead for Joint, Multi-Service, and DoD-Wide Programs (Measurable documentation of leadership in tri-service programs, initiatives, and steering committees - 2 points).*

The Edgewood Center is the Army's lead lab for the RDA of defense equipment and protection for U.S. armed forces on the CB battlefield. Because of this

unique military expertise, our CB Counterterrorism Team is a key participant in a national response capability involving a number of U.S. agencies.

Three of our scientists were recipients of an **Achievement Award** from The Technical Cooperation Program Subcommittee on Non-Atomic Military Research and Development.

Dr. Joseph J. DeFrank is **chairman of NATO Project Group 31**. The United States is the lead for this group which includes France and Germany.

Mr. Peter J. Stopa served as head of the U.S. delegation to NATO Project Group 32 on hand-held test kits.

Dr. James J. Valdes is the Army representative to the Tri-Service Committee on Biological Sensors, and the Army Focal Point for Army Manufacturing Biotechnology.

Dr. Randall S. Wentsel was appointed the DoD representative to the *Risk Assessment Subcommittee* under the **White House National Science and Technology Council**.

Mr. Roy Thompson was instrumental in initiating the DoD's **Environmental Security Technology Certification Program**. Mr. Thompson also assisted in cooperative programs with the Department of Energy to support dual-use technology.

Our Environmental Quality Office provides a DoD-wide hotline service for demilitarization and disposal guidance of old chemical defense equipment. More than 100 requests were answered during the year. A CD-ROM was widely distributed which provided users with a catalog of procedures from which they can select according to their needs. The system designer and operator, Mr. William Shulman (who recently retired), was honored on numerous occasions, including a commendation from the Adjutant General of Montana for the

assistance he provided to that State's National Guard.

1.7 *Quick Fixes for Troops [Problems addressed and fixed through Field Assistance Science and Technology (FAST), TRADOC Battle Labs, PMs, PEOs, etc. - 2 points].*

Mr. R. J. Holley, AMC-FAST Science Adviser at Fort Hood, was selected to supervise the implementation of a system that will track 20,000 new solargizers in their comprehensive Battery Management Plan. Mr. Holley will supervise fielding and installation of the equipment on Fort Hood vehicles. Mr. Holley will track progress and gather quantitative data on the savings generated through full implementation.

During field assessment visits, we received reports of broken internal drink tube couplings on our masks. It was determined that masks were not being stored properly in the carrier. The information on proper storage was sent to the users and we have noticed a marked improvement during subsequent visits. In addition, other problems, such as the uncomfortable mask noseclip reported by some warriors, have resulted in product improvements.

A continuing resource for our ultimate customer, the soldier, is our **toll-free chemical defense hotline with 24-hour response capability**. We provide prompt response to military and civilian inquiries on chemical defense equipment and its use. Many calls address issues other than that for which the hotline was originally intended. Whether the issues fall under the direct purview of this Center or not, every effort is made to point the inquirer in the right direction. The hotline's main purpose is to succeed under the concept of Total Quality Management by providing timely information to our customer. Nearly 280 calls were answered in the last 29 months (93% CONUS, 7% OCONUS). We have expended 150 man-hours on the customer contact portion of this program during the last 2 years.

1.8 HBCU/MI and Other Outreach Programs
(Document organization's efforts in meeting
HBCU/MI policy. Document other outreach
activities - 2 points).

We continue to provide research collaboration with minority institutions.

The Center has a \$2.8M contract (May 94-Apr 97) with Clark Atlanta University. This outreach program also marshalls the research capabilities of other institutions in the Atlanta area (Emory and Georgia State Universities) by subcontracts. A team of scientists from Edgewood visited Clark-Atlanta and presented a technical workshop on biological point and standoff detectors, aerosol cloud modeling, biotechnology, aerosol sciences and fluid dynamics, decontamination, chemical synthesis, and microbiological growth media. This workshop provided an opportunity for university professors to familiarize Edgewood scientists with the university and to strengthen our partnership with Clark-Atlanta.

As a continuation of previous efforts with Coppin State College, Dr. Gilbert Ogongi, Chairman of

their Natural Sciences Department, and Mr. William P. Ashman, Edgewood Center, are collaborating on a Pilot Project funded by the National Institute of Health. Mr. Ashman serves as an advisor on the program, assists in training the faculty and students, and provides guidance on the research.

Our personnel are good citizens in the communities surrounding our host installation. We extensively support the educational system through more than a dozen different programs. Some examples are:

Partnership in Education Program
Higher Education and Advanced Technology Program
Adjunct Professors
Science and Engineer Apprentice Program
Forum for the Advancement of Minorities in Engineering
Intergovernmental Personnel Act

We also contribute to the welfare of other communities. Our Improved Chemical Agent Monitor was used by the Environmental Protection Agency to conduct rapid, thorough monitoring of homes in an Ohio community suspected of being contaminated with pesticides. We are also involved in charitable and community service work.

II. VISION, STRATEGY, AND PLAN - 25 points

II.1 Organizational Vision, Strategy, and Plan (Documented evidence of a strategic plan and its connectivity to the overall Army Science and Technology Master Plan).

a) Understanding of Vision, Strategy and Plan Throughout Organization (Documented evidence of information flow; process of top-down/bottom-up dialogue - 5 points).

Our Strategic Plan is our living road map to the future. It was developed by the Enterprise Board of Directors at an offsite meeting in June 1995. The vision and strategy were conveyed to every employee in the Enterprise through town hall meetings by the Technical Director, chain teaching by the Enterprise directors and distribution of the strategic and performance plans to each employee. The Strategic Plan is also posted on our electronic bulletin board for employee comments and feedback on a continuous basis. Our strategic plan is a living document continually being improved. It also is our means of achieving our vision.

The Edgewood RDE Center is a fully integrated element of the NBC RDA Enterprise ("the Enterprise"), which includes our major business partners (discussed in Section I.1). As such, all strategic and business planning is fully integrated within the Enterprise. We created the Enterprise to meet the challenges of these changing times, i.e.,

- Proliferation of weapons of mass destruction (WMD) threat and demonstrated Congressional and Executive concern about the readiness and effectiveness of U.S. NBC Warfare Defenses.

- Public Law 103-160 requiring DoD to consolidate management and oversight of CB Warfare Defense.

- The National Performance Review and the Government Performance and Results Act (GPRA) focusing on a Government that works better and costs less.

We are now one of the few full spectrum RDA organizations, offering products and services from basic research and technology development through acquisition and life cycle support under one management team.

MISSION

- Provide U.S. forces with the capability to survive and sustain mission operations on a twenty-first century digitized battlefield through application of NBC defense, obscuration, flame, and non-lethal weapons science and technology, engineering, products, and life cycle support services.

- Leverage core capabilities by providing products and services to vital national programs such as chemical treaty verification and environmental remediation in partnership with government, academic, and private organizations.

We have 75 years experience and are a unique National asset.

b) Linkage to the Army-Wide Vision and Strategy: (Describe architecture of organizational strategy; evolution from Army-wide strategy - 5 points)

ARMY VISION STATEMENT

The world's best Army, trained and ready for victory. A total force of quality soldiers and civilians.

RDA Enterprise Vision

Be a recognized world leader in chemical and biological science, technology, engineering, and service by:

- Anticipating and exceeding our customers' needs with quality products and services
- Providing an environment that encourages and enables people to excel.

To achieve this vision, the Enterprise has four primary goals in the Strategic Plan. These goals, detailed below, are focused on improving our mission performance, maximizing Return on Investment, and maintaining and enhancing core competencies and capabilities, which are necessary to execute our mission.

- A values-based organization.

The Enterprise is values based.

- *Customer satisfaction* – anticipate, understand, and exceed expectations.
- *Leadership (people)*– value people as the most important resource
- *Teamwork* – inspire people to common goals and shared ownership
- *Integrity* – require the highest principles of ethical conduct
- *Continuous improvement* – always seek excellence in processes, facilities, services, and products.

- Equipped with the most modern weapons and equipment our country can provide.

Goal 1. Enhance the performance of the current NBC defense, smoke, and flame, incendiary, and non-lethal (FINL) research, development, and acquisition (RDA) mission. This means:

- Develop NBC defense, smoke, and FINL products that satisfy customer needs
- Deliver NBC defense, smoke, and FINL products by agreed-upon dates
- Field equipment in PM's five-year plans

- An integrated part of a joint team.

Goal 2. Expand the customer base within all Services to deliver NBC defense products, technology, and services. This means:

- Become the primary choice of the joint services in NBC RDA
- Develop equipment in accordance with joint service mission area priorities
- Horizontally integrate NBC defense and NBC contamination survivability technology and expertise into all DoD major systems.

- Able to respond to our nation's needs.

Goal 3. Support vital national programs with chemical and biological RDA expertise. These programs include:

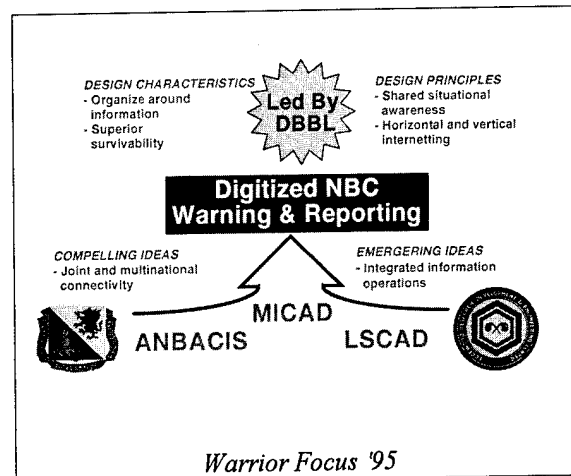
- Chemical demilitarization
- Chemical stockpile management
- Remediation/restoration of previous chemical activities
- Counterproliferation

- Changing to meet the challenges of today ... tomorrow ... and the 21st century.

Goal 4. Maintain core competencies by leveraging RDA products and services into new markets, in order to be able to respond in times of national emergency.

These goals are truly strategic in scope and are used to guide activity at all levels of management down through our empowered teams. In addition to the goals, there are seven Enabling Strategies, dealing with Leadership, Customer Satisfaction, Communication, Technology Application, Process Reengineering, Human Resources, and Teaming, which provide a framework for continuous improvement of all aspects of the Enterprise. They define a common theme about the way we want to do business in the future. These strategies will enable us to create the type of organization needed to reach our goals. Many are related to the overall health of the Enterprise. Each goal and strategy has a member of the Enterprise Board of Directors as champion, focusing attention on its accomplishment.

Our strategic and business plans are responsive to Congressional law, requiring management of CBD through a single DoD office, and from HQDA responsibility as lead service for CB Defense RDA. Our plans are tied to the vision and needs of the Army, as well as the other services, and are the foundation to meeting the Joint Chiefs of Staff Future Warfighting Capability Requirement, countering the threat of WMD. Our vision and mission directly supports those of AMC and DA. We also make major contributions to the Army Modernization Objectives of Protecting the Force and Winning the Information War (DIS for CB). Our NBC Modernization Strategy reflects the needs of TRADOC, the Battle Labs, and the Joint Services. Key strategies are tied to AWEs. For example, stand-off chemical detection, automated NBC reporting and analyses was demonstrated in the Warrior Focus AWE as part of the digital battlefield and situational awareness.



Our technology base focuses on transitions and long-term requirements in the funded future development programs of our partners. Documenting the reality of strategic goal #2, the CB Defense chapter of the ASTMP was written this year to capture the Joint Service CBD program as it applies to Army capability requirements. This was mirrored in our materiel developer input to the NBC Annex to the Army Modernization Plan. All this information and the program it represents was portrayed in the CB Defense and Nuclear DTAP done in FY95 and just completed again in FY96. It is presently being included in the Joint Service RDA Plan for CB Defense.

II.2 *Business Plans and Programs Flowing from Strategy (Evidence of a business plan capturing core competencies and capabilities, and relating competencies and capabilities to program directions, execution, STOs, and ATDs - 5 points).* The four core goals which are focusing our current strategic planning efforts are being simultaneously implemented in business plans and programs within the center.

GOALS: Enhancing RDA Performance/Expand the Customer Base in All Services. One focus of our strategy for achieving goals 1 and 2 is Partnering with customers and suppliers. This is evident in our program plans, as highlighted below.

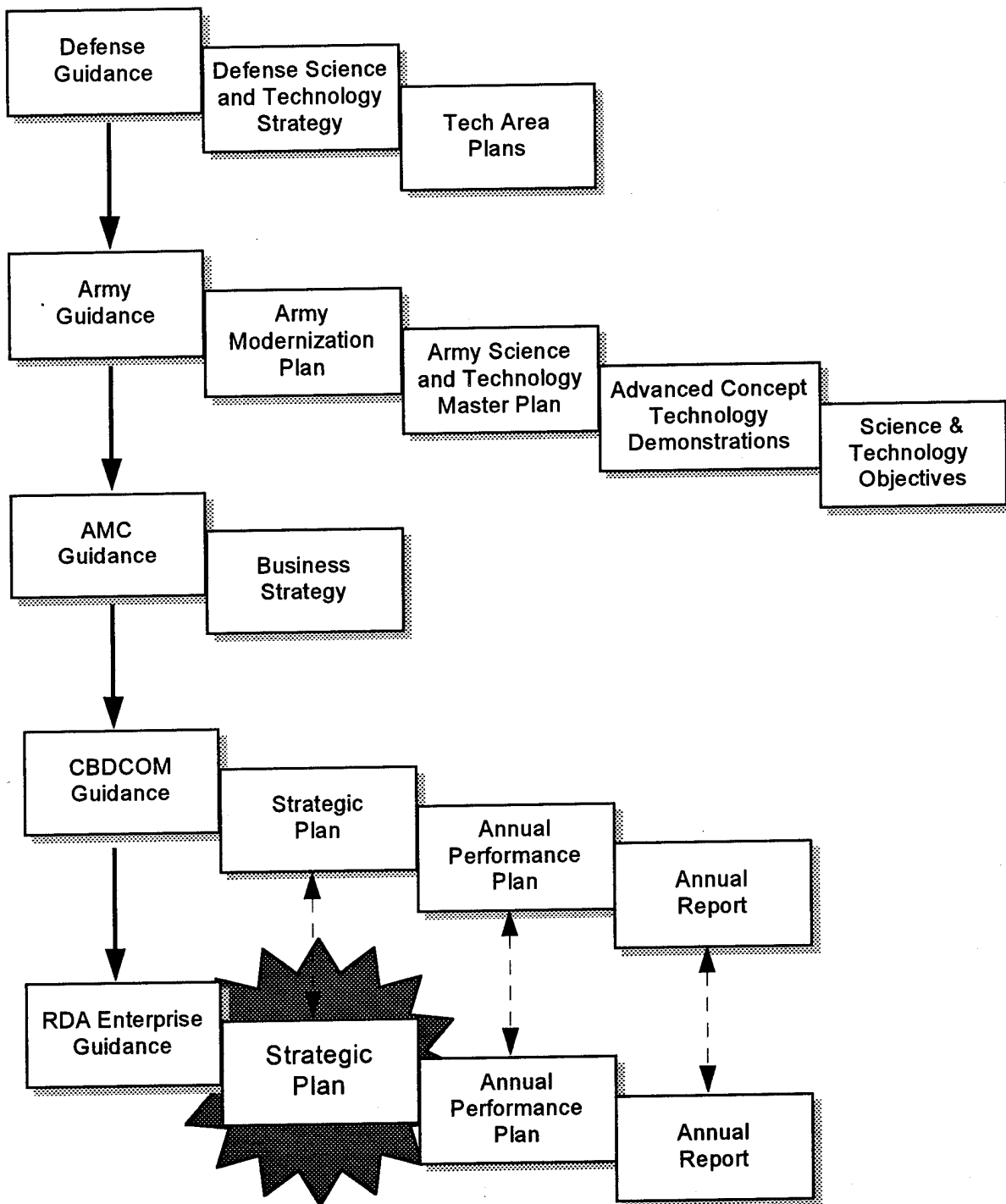
STOs and ATDs. Edgewood RDEC has focused its proposed STOs and ATDs on critical needs and opportunities for the battlefield. Most of our demonstration programs are relatively small by ATD standards, but we were successful in having one approved for an Integrated Biological Agent Detection capability. Our Joint Service team is in place and is leveraging all services' technologies and requirements in this effort. For Army, the Dismounted Battlespace Battle Lab and the U.S. Army Chemical School are members of the ATD team. We will transition successful concepts to the Joint Program Office for Biological Defense, also a team member, for development for all services. Another STO involves a miniature point chemical detector. This is also a joint technology effort under Edgewood Center management with Navy and Air Force participation. The follow on development will be Joint under Air Force leadership. Application to Gen II Soldier, combat vehicles, ships and aircraft are planned. Other STOs cover MMW screening capability for our large area smoke system and antibody manufacturing development in support of the bio detection program and other potential joint service applications.

Teaming. Teaming is a major tenet of the center. It begins with teaming of multidisciplinary engineers with the technology team as soon in the concept phase as possible to ensure engineering principles are employed early. These engineers and core technologists form the majority of the team after transition to the acquisition phase, usually managed by an Enterprise PM. Our MICAD development team, matrixed to the PM NBC Defense, is carrying partnering and teaming to its logical conclusion — working with their contractor, Loral Librascope, to create a seamless government-industry team.

Modeling and Simulation. We adopted a thrust to place CB Defense into the heart of modeling and simulation initiatives within Army and the DoD. We recognized our limited expertise in this area, limited resources, and a historic reluctance of the simulation and wargaming community to

implement costly and slow CB overlays in their games. Our strategy called for exploiting the LAM '94 issue, Weapons of Mass Destruction, as the impetus, and forming a multi-service, multi-agency DoD team to implement the plan. By August of 1994, JANUS-A had been successfully modified to play Chemical events with negligible impact on speed. On-going CB DIS enhancement efforts include the M21 Standoff Chemical Detector, Lightweight Standoff Chemical Agent Detector, Biological Standoff Detection System, Biological Integrated Detection System manned simulation, PC based simulators of the BIDS point detector suite, Multi-use Integrated Chemical Agent Alarm, and an After Action Review System to facilitate analyzing the results of CB DIS exercises. These tools, specifically designed to support materiel acquisition of CB defense equipment, are being used for engineering design and system optimization studies; "value added" evaluations (by the military) throughout the development cycle, and validating the results of conventional studies and analyses. The CB DIS capabilities developed for materiel acquisition can also be applied to other military applications on DIS such as test and evaluation, training, combat development, and mission rehearsal.

Joint Service Reliance. The Edgewood Center and the RDA Enterprise are the lead for the Joint Services in the area of CB Defense. Under the auspices of the Reliance Technology Panel for CB Defense we have a Defense Technology Area Plan in place, an integrated long-range technology investment strategy meeting all service needs within resource constraints. We placed representatives from each of the services on our in-house tech base planning teams, in addition to representatives from Battle Labs and the Chemical School. We have moved our Joint Service Partnership beyond Reliance to integrate our technology base planning with Acquisition planning. We are operating in full partnership with our colleagues and customers in all services.



HIERARCHY OF PLANNING DOCUMENT

GOAL: Support Vital National Programs. Our major thrust in this area involves leveraging our core CB Defense capabilities to solve National problems. We have active commitments for:

- technology support to CDRA for alternatives to incineration for non-stockpile chemical munitions
- support to Russian Demil and Chemical Weapons Convention compliance
- matrix support to CDRA in demil of the chemical weapons stockpile
- support to other Federal agencies in CB counterterrorism,
- technology support to the Naval Research Laboratory to develop and operate a new mesocosm for biodegradation,
- technology support to AEC for environmental remediation.

GOAL: Maintain Core Competencies by Leveraging New Opportunities: Our focus is the domestic Technology Transfer initiative and its concomitant ability to leverage in-house resources to maintain our core competencies to support our DoD mission. One major achievement is a CDRA with the state of Maryland to operate our biotechnology process engineering facility as an incubator for new bioproducts.

We are continuing our efforts with several ongoing actions to produce additional leveraging opportunities. A CRDA is in process with a manufacturer of analytical instruments. This effort will improve the capability of the Center to meet the requirements of the Chemical Weapons Convention inspection. Another CRDA involves an effort with two commercial companies to design and construct a device with which to monitor the environment. This device will have value to industry and the DoD in monitoring environmental hazards and improve our

capabilities in chemical agent standoff detection. Another commercial biotechnology firm will be doing a study on scaling up a bioprocess using our facilities and training our people in the process.

II.3 Incentives Linked to Vision and Strategy (Organizational mechanisms used to promote personnel linkage and adherence to organization vision and strategy; such incentives as awards, recognition, program resourcing, etc., should be documented - 5 points).

Our strategic and performance plans designate the Directors and PMs of the Enterprise as champions for the goals and objectives to achieve our vision and strategy. Each director has responsibilities under the strategic and performance plans incorporated in their TAPES. Responsibilities are propagated further into TAPES standards for subordinates, as appropriate. An example is the Advanced Systems Concepts Directorate championing our enabling strategy for customer satisfaction as our way of doing business. An objective committing to customer satisfaction is in every Enterprise director's TAPES and transferred to each team leader and every member of the Enterprise. This physically links the performance of every employee and focuses it towards achieving our vision.

Team recognition through awards is an incentive linked to our vision and strategy. This year we awarded cash to five teams made up of over 50 Enterprise employees for supporting strategic planning. Four teams used an Analytical Hierarchy and decision tool to identify barriers and strategies for achieving our top four goals. The recommendations of these teams were also used in creating the seven enabling strategies for improving the key processes in the Enterprise. The 5th team received cash for submitting the Enterprise's Application for the 1996 Presidential Quality Award (PQA). All of these teams were recognized at an Executive Board meeting and thanked for their contributions towards crafting the Enterprise's Strategic Vision and Strategy. The Board directed

the integration of PQA criteria into our Strategic Enabling Strategies to create a single set of performance metrics.

An absolute commitment to our organization's Values and Visions was demonstrated this year by the Tech Director requiring every director, team leader, and supervisor to take a curriculum in Leadership training taught by employees certified as Development Dimensions International instructors. The material reinforced the Enterprise values. This was a follow-on to the Skills and Techniques for an Empowered Workforce (STEW) team training provided last year. We are committed to building a strong foundation for the future of the Enterprise and every member of the Enterprise team. The Executive Board and their teams are participating in a 360-degree multirater assessment as a first step in adopting this process across the entire Enterprise.

Two special training courses were offered to the entire workforce on customer service, thereby directly supporting our strategy to have customer service become an organizational way of life.

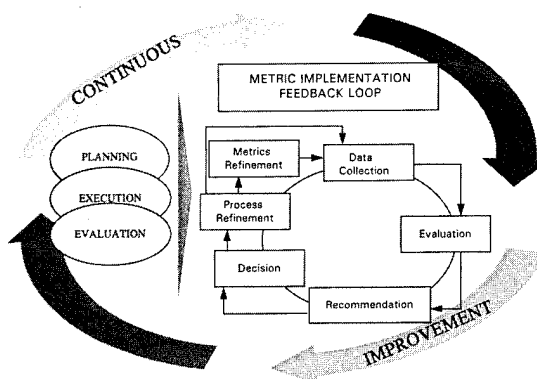
The CBDCOM electronic bulletin board and Zapp system have been used extensively to reinforce the importance of the strategic plan and to answer questions from the workforce.

Developmental assignments remain a critical method of cross training our employees in all phases of the acquisition process. The Advanced Systems Concepts Directorate currently has eight matrixed employees for cross training.

II.4 Business Plan Implementation and Progressive Measurement System (Documented process for measuring progress toward organization's strategic goals - 5 points).

The GPRA requires all Federal agencies to develop 5-year Strategic Plans, Annual Performance Plans, and Annual Assessments of organizational performance against strategic goals by September 1997. The Enterprise initiated this requirement in

FY95, and will evaluate our progress by using this process in FY96. Our Annual Performance Plan contains outcome oriented metrics that link technical and program performance to achieving our strategic goals. Our current process excels in the involvement of all levels of our Enterprise in planning, executing, evaluating, and making improvements. All activity takes place concurrently, but the data address the three different phases of planning, execution, and evaluation as shown in the figure.



Business Planning Process

The mission, vision, values, and overall Command strategic direction, and goals are agreed to by our CBDCOM council. This includes the Commanding General, Executive Director, Chief of Staff, Technical Director of the Enterprise and Business Manager of the CB Stockpile. Each business area manager then develops supporting goals, strategies, objectives and measures of performance to ensure achieving the Command strategic direction.

Our process flows through the Enterprise from business area managers to the teams to each individual, promoting accountability and linkage to the strategic goals. Our progress is reviewed quarterly by the RDA Enterprise Board. Business reviews are also held during the year to assess program progress. The purpose of the review in January was to give the leadership insight into the total Enterprise program, provide senior management oversight of activities at the top level and give the Enterprise Board a better understanding

of our product line for critical resource decisions. During the latest ICR on 20 Feb 96, progress against the enabling strategies of our strategic plan was assessed and objectives were revised. An

off-site strategic planning meeting is scheduled for 8-9 May 96 at which time another assessment of progress against our strategic goals will be made and the current strategic plan updated.

III. RESOURCE UTILIZATION - 20 points

III.1 Professional Recognition (*Professional recognition of science and technology of personnel as measured by honors, numbers of presentations, patents and image among peers*).

a) **Patents, Papers, Citations, and Other Achievements** (*Documented number of patents, with emphasis on those leading to key insertion to product; number of papers, noting seminal papers and papers cited often as noted in "Citations Index" - 5 points*).

Edgewood Center currently has four patent licensing agreements in effect:

- Abbott Laboratories will pay a **licensing fee** for the use of technology developed at Edgewood. Included are rights to patents covering the use of polyalphaolefin liquid Emery 3004 as a safe, noncarcinogenic replacement for dioctyl phthalate (DOP) in hot/cold smoke filter-testing machines. Emery 3004 and 3002, approved by the U.S. Surgeon General to replace DOP, are rapidly achieving worldwide acceptance.

- A patent licensing agreement with EAI Corporation of U.S. Patent Application No. 08/326,338, ***Air Transportable, Modular Analytical Laboratory***. This laboratory system is a series of transportable modules developed to support the requirement for on-site analyses during chemical weapons inspections, which are essential to verify compliance with the Chemical Weapons Convention. The system will provide quality assurance and quality control equivalent to that of permanent laboratory facilities and will enable the

on-site analyses to be completed within the time constraints set forth in the treaty.

- A patent licensing agreement with Environmental, Health & Safety Products, Inc., is a nonexclusive license to develop and market a pesticide detector, as well as other products that may be produced by practicing the invention.

- A patent licensing agreement, with Battelle's Pacific Northwest Laboratory, is an exclusive license to develop and market devices or systems based upon reactive bed plasma technology; for example, air purification systems.

The royalties generated from these agreements will be shared by the inventors, current and former employees of the Edgewood Center, and by the Center itself, at the discretion of the Technical Director and within the constraints of the law. Negotiations on three additional patent licensing agreements are nearing completion and are expected to be signed soon.

- A patent disclosure was submitted for an *in situ Derivation Adapter for an Infrared Pyrolyzer*. The proposed invention incorporates the Fatty Acid Methyl Ester (FAME) biological identification technology into the Chemical Biological Mass Spectrometer (CBMS) without any significant modifications to the CBMS hardware. Combining the FAME and CBMS technologies will allow one to exploit the rapid analysis capability of the CBMS along with the powerful identification capability offered by FAME.

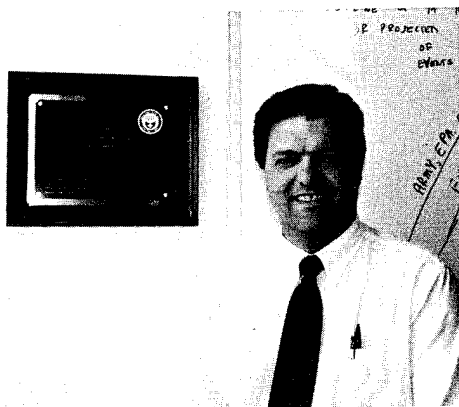
A compendium of patents issued to Edgewood Center personnel and which are still valid was prepared and distributed to interested parties in an effort to stimulate interest in licensing by private business concerns. Several inquiries concerning licensing opportunities were received; some are entering into preliminary discussions.

Dr. Yu-Chu Yang had an invited article, entitled "Chemical Reactions for Chemical Warfare Agents" published in *Chemistry & Industry*. Dr. Yang is a renown expert on neutralization or destruction chemistry. She is the one called upon to address Citizen's Advisory Council meetings.

Dr. Steve Harvey has authored several papers on HD neutralization and biodegradation; he also has been called upon as an expert on this research.

Over 150 technical reports were published during FY95.

b) Honors, Presentations, and Image Among Peers (*Documented number of citations for fellowship in societies, invitations to scientific symposia and workshops; invitations to write seminal review articles, etc. - 5 points*).



Mr. James A. Genovese

Our Counterterrorism Team was honored for mulling the "Unthinkable." Mr. James Genovese, Mr. William Drumgoole, Mr. Raymond Miller, Mr. Gary Sakay, Mr. Paul Schabdach, and Mr. Alan

Seitzinger received an **Outstanding Achievement Award** from the Office of Emergency Preparedness/National Disaster Medical System for their outstanding dedication and performance in counterterrorism activities for support provided to the U.S. Public Health Service in U.S. Government emergency preparedness programs and operations. "It confirmed within me and the rest of the team that we're doing vital work here," Genovese said of the recognition from another Federal agency."

Dr. James J. Valdes was an invited participant at a review of the President's 25-point program on *Reinventing Environmental Regulation*, sponsored by the **National Environmental Policy Institute**. President Clinton and Vice President Gore asked the Institute to review their program and recommend changes. Other participants included senior vice presidents from IBM, GE, B.F. Goodrich, AT&T, four assistant and associate administrators from the Environmental Protection Agency, senior representatives from local and state environmental protection agencies, and Kathleen McGinty, the President's senior advisor for environmental policy.

Mr. Peter J. Stopa received a **Federal Laboratory Consortium Award for Excellence in Technology Transfer for 1995**. The award was presented at the FLC National Technology Transfer Meeting in April 1995 in Atlanta. Mr. Stopa was recognized for his work with immunoassay detection kits and a bioluminescence monitor.

Dr. Sharon Reutter and COL John Wade will receive a **1995 Army R&D Achievement Award** at the Army Science Conference in June. They are being recognized for preparing an extensive review of existing toxicity data and human estimates for selected chemical agents and recommended human estimates appropriate for defending the soldier.

Dr. Orasio I. Sindoni was invited to present a paper at a special session of the **Sensor and Propagation Panel of the Advisory Group for Aerospace Research and Development (AGARD)** at the Pratica di Mare Air Force Base, Pomezia, Italy.

Even though the U.S. Army is a full member of the advisory group, it is rare that any U.S. scientist is invited to participate. The research in aerosol science by our scientists has not gone unnoticed and precipitated the invitation.

Mr. Stopa chaired a session at the **International Conference on CB Protection**, Stockholm, SW, on *Chemical Detection Technology* and presented two papers. Mr. Stopa also received the **General Karol Kaczowski Medal** at the 11th Annual Conference on Diagnostics in Microbiology, held at the Military Institute of Hygiene and Epidemiology, Pulawy, Poland, for efforts in helping to foster Polish-American cooperation in biological analysis methods. This was the first time an American received this award.

Dr. Valdes was co-organizer and chairman of the **1995 Keystone Symposium on Environmental Biotechnology**.

The Baltimore Region of the Federal Executive Board selected Center employees for Excellence in Federal Careers awards as follows:

- Thomas D. Marchand (Category IA - Silver)
- Ronald O. Pennsyle (Category IIA - Silver)
- Juanita Keesee (Category IIIA - Silver)
- Patricia A. Phillips (Category IV - Bronze)
- William Roger Sayers (Category V - Silver)
- Dr. Harold Banks (Category VI - Bronze)
- Carole A. Andrews (Category VII - Bronze)

Mr. George Collins received the **Army Materiel Command's Chemical Safety Professional of the Year Award** for his work as Chairperson of the Chemical Agent Safety and Health Process Action Committee and in developing Army chemical safety policy.

The AMC charter for Managing Chemical Agent Contracts designates our Technical Director as the **focal point for the management of chemical agent contracts for contractor-owned**

contractor-operated RDT&E laboratory facilities.

Dr. Randall S. Wentsel was a peer review panel member to evaluate the scientific merits of ecological benchmarks for **Superfund**. This Environmental Protection Agency program is developing screening level benchmarks for use at Superfund sites. The project is operating under the name **Ecotox Thresholds**.

Mr. Joseph Domanico was one of **Ten Outstanding AMC Personnel of the Year** for 1995.

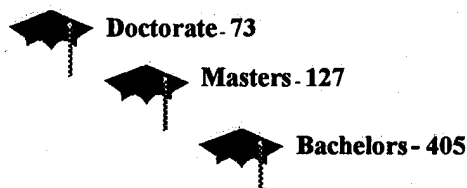
Mr. James Church was invited to join the **American National Standards Institute Z88.10 Subcommittee on Respirator Fit Testing**.

Aberdeen Proving Ground's Federal Women's Program named our Engineering Directorate **1995's Activity Most Supportive of FWP Goals**. We also had three winners in Aberdeen Proving Ground's **Volunteer of the Year Award** competition during the past year.

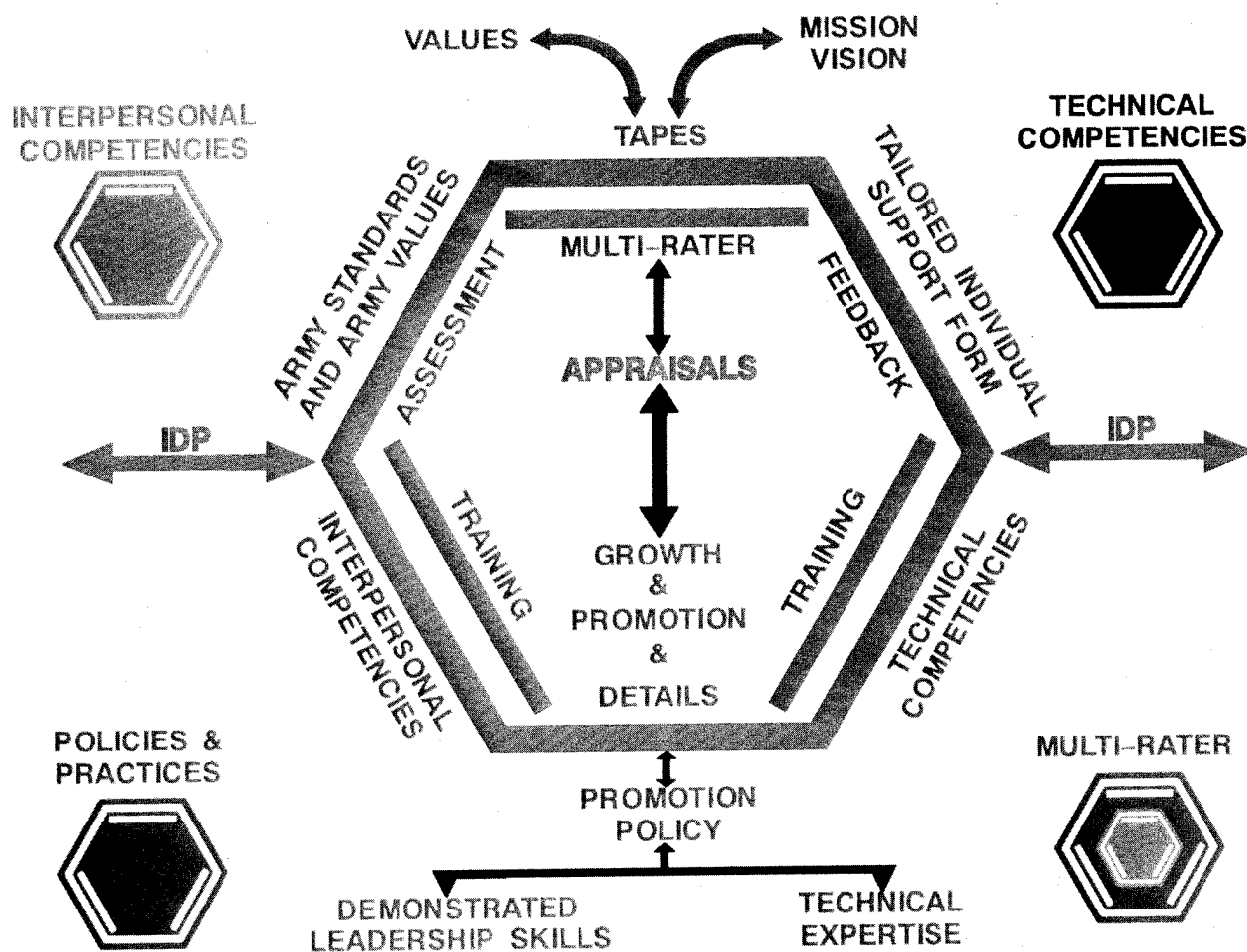
III.2 *Education Profile (Statistics on academic degrees and other educational attainment of personnel - 4 points).*

The educational profile is one of the data points that we use in our overall Integrated Personnel Professional Development model, which is shown on the next page.

Total Work Force = 1,066



INTEGRATED PERSONNEL PROFESSIONAL DEVELOPMENT



The system's **framework** is set by the Center's mission and values, which state **WHAT** our business is and **HOW** we accomplish it, and is reflected in each employees **TAPES**. The performance plan interweaves tasks (technical mission accomplishments) with standards (interpersonal competencies) and professional growth (individual development planning).

The system framework is supported by the Center's unique set of **policies and practices**: **IDPs** - every employee will collaborate with their leader to develop a career road map; **training** - a liberal policy in budget and time allows training commensurate with the Army's best interest; **Labor** (Management Partnership formed for the Command by labor

leaders and managers drawn from the Center); a promotion policy that requires a selection process that places equal value on technical and interpersonal competencies. The **policies and practices** are implemented by interlinked systems centered around **interpersonal competencies**, **technical competencies**, and the in-house designed **Multi-Rater Assessment**. The implementing system for **competencies** is comprised of a set of in-house designed programs focused on skills required to conduct the business of the Enterprise in today's competitive environment: leadership, teamwork, team building, performance coaching, reviewing and appraising, professional development planning, self-evaluation, and 360-degree assessments.

In FY95, Dr. Mark Althouse defended his Ph.D. dissertation at the University of Maryland. The dissertation work was in direct support of the Center's CB Standoff Detection program.

We also had five employees earn their Master's of Science in Chemistry from Drexel University. One employee completed all the requirements for his Master's in Business Management, and another employee achieved her Bachelor of Science in Business Management.

The Center's Safety Team excelled in professional certification during 1995. Mr. Peter Spaeth completed his full certification as a safety professional and Ms. Carol Eason and Mr. Scott Wright received the designation of associate safety professionals (ASP) after successfully completing the examinations produced by the Board of Certified Safety Professionals. Carol and Scott will now prepare, along with Jef Franchere (received his ASP in 1994), to complete the second-level examination to achieve the designation of Certified Safety Professional (CSP).

Mr. Robert A. Richer, Organizational Improvement Specialist, became certified to use the Myers-Briggs Type Indicator (MBTI). Within the Command, the MBTI is employed as a basic team building tool. During Mr. Richer's workshops, teams discover how their differences in perception and judgment serve to enhance their relationships and the quality of their work.

Dr. Valdes was appointed **adjunct Professor of Toxicology** at the University of Maryland. The Toxicology Program includes faculty and students throughout the University's system.

Dr. Randall S. Wentsel was recently elected to the **Board of Directors of the Society of Environmental Toxicology and Chemistry** for the term 1995-1998.

III.3 Professional Development (Cite professional development opportunities, including program for continuing education of scientists and engineers - 4 points).

Our Career Development Advocate developed the following integrated systems approach to personnel management and professional growth and development (see graphic on facing page). Each system in the plan is based on a cooperative team effort with the Center's employees, Union members, and managers.

The system for Technical Competency is designed to advance and complement the functional talents of our highly trained work force. This system, supported by the training policy, encourages employees to take advantage of higher education opportunities through the Enterprises' partnering with Harford Community College, the HEAT Center, and Drexel University. The other aspects of the Technical Competency System support career growth from one job series to another, via classroom and on-the-job training. This system also ensures certified competency for our scientists, engineers, procurement specialists, comptrollers, and in multiple functional specialties in acquisition and other Army-required skills.

The Multi-Rater system is a newly designed in-house assessment tool created as an Enterprise (and Command) specific 360-degree assessment. The design of this instrument focused on seven characteristics deemed most critical to the success of the Enterprise and our employees, at each level, from entrant engineer and secretary through Technical Director and Commanding General. These seven characteristics are technical competency, leadership, planning, self-management, communication, and teamwork; all centered around customer service. A set of 56 skills describe the seven characteristics. Voluntary participation in the multi-rater assessment affords our employees a snapshot of abilities in all areas that comprise our Integrated Personnel Professional Development system of systems. The employee may then map out their career road map for preparation of the Individual Development Plan that marries individual professional growth needs with the mission requirements of the Enterprise.

Embracing the potential of her new position, our Career Development Advocate achieved remarkable results. By the end of FY95:

- 100% first line supervisors received leadership training
- 475 supervisors and team members were trained in TAPES
- 200 participated in a pilot study on the Multirater System
- >750 were certified for the Army Acquisition Workforce
- >200 were trained through the Secretarial Enhancement Program
- >500 participants received Empowered Workforce training
- >700 participants received Environmental Compliance training
- 1/5 of S&Ts benefit from FACTOR IV Program
- >1100 received ZAPP training
- >300 trained in Individual Development Planning
- >50 Mentor/Mentoree Teams

Ms. Suzanne S. Milchling was recently selected as the Acting Associate Director for the Edgewood RDE Center. Her selection was due in part to her participation in the Executive Potential Program (EPP). The EPP is a career enhancement program that provides training and developmental experiences for high potential GS13-14 to prepare them for managerial and executive positions, as an SES, in the Federal government. Ms. Milchling was the first individual from CBDCOM to attend this program.

Ms. Denise A. Pobedinsky, a GS-13 Physical Scientist was selected as a Team Leader in the DoD Executive Leadership Development Program. It is particularly significant to have a GS-13 selected as a team leader for this program, which is the only civilian joint education and development program in DoD reflective of Congressional intent in the Goldwater-Nichols Reorganization Act of 1986.

Dr. Richard R. Smardzewski served as an invited outside evaluator on the Naval Research Laboratory's **4th Annual Young Investigator Program**. This program is specifically designated for those investigators who are no more than 5 years

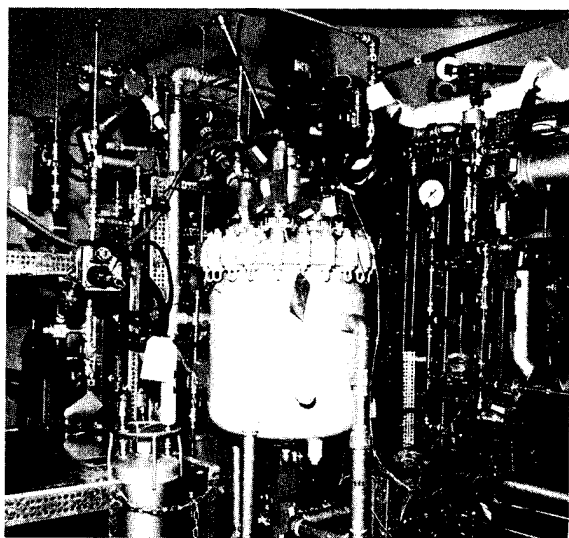
beyond award of their University degree. This program is similar to the Army's Independent Laboratory In-house Research Program.

A new and creative effort is a human resources database in our Engineering Directorate, database tracks the skills and abilities of all their personnel. After determining the skills required for future projects, the database is used to identify shortfalls. Management then decides if they have to provide training to existing personnel or if they will need to hire a contractor to provide the skills that the team will need to satisfy the customer. We plan to adapt and deploy this system to other directorates. Bench marking for this was done at Lockheed-Martin and Westinghouse and is aligned directly with our Strategic Plan, Enabling Strategy 6: Human Resources, to conduct a task and skills analysis and project future skills needs.

We also aligned educating, training, and developing needed skills with a wide variety of effective programs. We are expanding our Factor IV system to support attaining goals outside the research area where it is currently used. The Factor IV Program allows a technical expert to be fairly compensated even though they choose not to become a manager. This forward thinking will allow us to be ready before requirements arrive and to satisfy the customer by giving them top quality and timely service.

III.4 State-of-the-Art Equipment and Facilities (Adequacy of facilities, equipment, and supporting capabilities - 2 points).

Our recently completed \$2M **AMC Treaty Laboratory** supports U.S. DoD interests in chemical warfare treaties by analyzing samples for any compounds of interest using state-of-the-art analytical instrumentation and the most sensitive methods available. The Laboratory, which has scored the maximum possible on the past two Chemical Weapons Convention Preparatory Commission sponsored proficiency tests, is in the final stages of obtaining ISO 9001 certification for all its operations.



Nearly \$1M was spent to modify an existing chemical explosion chamber into a **state-of-the-art analytical facility** to support the alternative technologies to incineration program. This laboratory performs quick turn around of decomposition analyses. These modifications were

planned and completed using the same team of engineers, scientists, and contractors performing the reengineering process design.

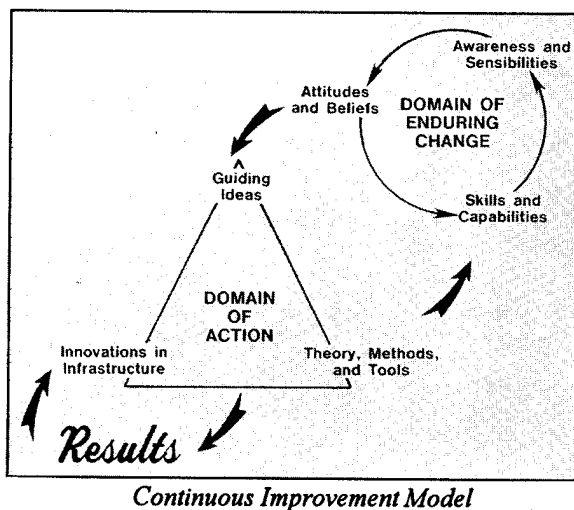
Our Bioprocess Facility is both the *Bioprocess Engineering Facility* and the *Biopolymer Facility*. The Biopolymer Facility houses the only high-field, high-resolution, four-sector, tandem mass spectrometer along with equally atypical mass spectrometers and allied instrumentation available anywhere within U.S. Government laboratories. It supports process development of antibodies and thermostable enzymes used in biological detection and processes used to support chemical agent demilitarization and production processes for materials for environmental bioremediation. Through a partnership with the Naval Research Laboratory under a Strategic Environmental R&D Program, we developed a **Mesocosm**, which is also housed in our Bioprocess Facility. The Mesocosm enables large-scale testing of microbial biodegradation systems for environmental remediation projects and simulates critical field parameters under controlled laboratory conditions.

IV. CONTINUOUS IMPROVEMENT - 15 points

IV.1 Processes [Documented methods by which customer feedback influences program evolution (i.e., advisory bodies, meetings, milestones, and budgets) - 10 points].

The Enterprise translates requirements from strategic and business planning into its human resource management process in numerous innovative ways. Our purpose is quite simple: We want to have people with the right skills in the right place at the right time to accomplish our mission and satisfy our customers.

The leadership organized the Enterprise to make it easy to meet the ever-changing mission requirements and to satisfy our business drivers. The Enterprise Human Resource Performance Plan is the plan for Enabling Strategy 6: Human Resources of the Enterprise Strategic Plan. With that alignment, we pay careful attention to the well-



being, health, and development not only of the organization but also each member of our diverse work force. The figure depicts the planning linkages.

We created a flexible, customer-oriented Human Resources planning system that leverages our unique position as an RDE center. Many of the administrative aspects of human resources are mandated by law, such as benefits and compensation, and are handled by the installation. We focus our attention on the development and well-being of our people. Each directorate has an administrative officer responsible for coordinating the training and development needs for their directorate. They are located with the people they serve and can respond to their needs rapidly and follow through to ensure satisfaction.

Under the leadership of our Chief Executive Officer, the Enterprise Board, all managers, supervisors, team leaders, and the entire work force are encouraged to 'break the mold,' to take appropriate risks, and to always venture beyond basic requirements. The Enterprise's training policy gives much latitude to supervisors and team leaders so that all employees can be encouraged to take a wide range of training. Sufficient training money and training time are built into the Enterprise equation for achieving human resource goals.

A Board member initiated the Facilitators' Planning Committee and currently chairs the committee. Other members of the Board support the use of Facilitators certified under the provisions of the Charter within their activities. The Facilitators are trained in TQM techniques, interpersonal relationships, and teaming concepts. Their work with PATs and teams helps to communicate and reinforce the behaviors that enable the implementation of organizational values and expectations.

As part of the concurrent engineering process, project teams, using the Integrated Product Teams model, have a customer and user representative designated as an active member of the team. Decisions regarding design, schedule, budget and test are made with the full input of the customer. This continuous feedback has resulted in better decisions and improved customer satisfaction.

Since customer satisfaction is a key driver, we recognized the need to provide employees training

on customer focus and satisfaction. We brought the Dale Carnegie course, *Customer Service and Effective Sales*, on site and more than 50 people were trained. The training served as a strong foundation upon which to build the Enterprise's customer service policy. It also provided an awareness to the work force that customer service is everyone's responsibility. A new module was also added to the Skills and Techniques for the Empowered Workforce training titled, *Service Plus*, which is geared toward dealing with and satisfying the needs of customers.

Our customer service standards are reviewed, updated, and published annually in the Performance Plan and deployed throughout the Enterprise. Customer surveys, repeat business, and number of customer complaints serve as an indicator of our performance against these standards. On the day-to-day level, the process of responding to complaints is frequently as quick as the customer bringing up a concern in a team meeting and having the entire team respond immediately to the issue. Our policy is that complaints will be handled at the lowest level possible; however, the Enterprise product and service managers have a high profile, so customers may go straight to the top.

A key measure of the effectiveness of our processes is the obligation of funds. The Army goal for the RDTE appropriation is to obligate 95% and disburse 55% of its total program. The Command's FY95 RDTE appropriation exceeded these goals by obligating 99% and disbursing 65% of its program. The goal for the Procurement appropriation is to obligate 75% of its program. The Command exceeded this goal by obligating 90%. Exceeding the goal as we did leaves fewer unobligated dollars at risk since these funds can still be used during FY95 and FY96. Very aggressive goals are placed on us for the Operations and Maintenance appropriation. DA's goal is 99%. As reflected above, we exceeded performance goals for all appropriations. DA places significant emphasis on organizations meeting assigned goals. CBDCOM exceeding the goals should reduce the likelihood and magnitude of future program reductions by higher headquarters.

Another indicator of our success is in Value Engineering Savings. During FY95, eleven actions resulted in \$343,000 in savings. Three of these VEPs were in-house proposals that amounted to \$208,000: the M40/42 Mask accounted for \$47,000, the M18 Smoke Grenade for \$48,000, and an action on DS2 for \$113,000. The remaining eight were contractor initiated proposals that totaled \$135,000. Three systems accounted for these eight VEP's: the Chemical Agent Monitor was credited with \$14,000 in savings, the M40/42 Mask with \$54,000, and the M17A3 Lightweight Decontamination System with \$67,000.

A total of 208 suggestions were submitted to Aberdeen Proving Ground Support Activity in FY95 under the Army Ideas for Excellence Program (AIEP). Personnel at CBDCOM submitted 51 (25%) of the suggestions. Of the total number of suggestions awarded at APGSA, 13 (20%) of those were adopted/implemented as a result of suggestions by CBDCOM persons. This voluntary program is a management tool for promoting employee involvement. It provides us an opportunity to be creative and to generate ideas to improve efficiency and effectiveness.

IV.2 Accountability and Personnel Linked to Process (Methods used to link personnel to the process of improvement, and insure personnel accountability for expectations at all levels - 5 points).

Since the Enterprise mission directly affects the community, we involve State and local government and the general populace in key business decisions. State, local, and general public awareness of environmental matters is extremely high in the counties adjacent to the installation. The Enterprise contributes willingly and openly to explanations of its environmental programs through public meetings and hearings, exhibits, press releases, and publications.

The Center is committed to providing better customer service and fosters an environment to encourage and inspire people to continuously seek excellence in our processes, facilities, services, and

products. Understanding the nature and needs of the customer is the key to providing high quality service. To strengthen our commitment to customer satisfaction, we examined our interaction with internal and external customers and developed several methods to incorporate customer feedback into program evolution.

Quarterly performance reviews by the Enterprise Board are the primary system used to evaluate the major processes owned by the leaders on the Board. In addition, members of the Board conduct their own reviews of work unit performance ranging from formal in-process reviews (held at key points in the acquisition cycle) by the product developers to the scanning of weekly status notes by leaders for trouble spots or process weaknesses. At the Corporate level, the Chief Executive Officer uses his Board on a bi-monthly basis to give and get feedback on current problems of interest and to come to consensus on how to solve them. Yearly offsites are held to chart Enterprise strategic direction.

In a continuing effort to exceed customer expectations and reduce development cycle time and cost, we have shifted efforts heavily into modeling and simulation. Combining modern technology with customer involvement is facilitated by the extensive use of Integrated Product Teams. Product and service design requirements are continuously interpreted at all stages through the IPT process. Our new team-based organization is making remarkable progress in developing and fielding quality systems; for example, Smoke Generator, the Biological Integrated Detection System, and the Remote Chemical Agent Detector. These teams are driven by customer service, satisfaction, process efficiency, leader involvement, and pride of ownership.

We recognize the importance of personnel in the process of improvement and in the increase of efficiency and competitiveness of the Center. Every Edgewood RDEC employee is empowered to resolve issues arising with their customer, realizing that management is available with the more difficult issues. It is the responsibility of each employee to be

accountable and to become an effective member of the improvement process. Education and assessment are keys to supporting a work force that is empowered. The result — a work force with a better understanding of customer requirements and expectations that provides outstanding customer service.

We placed liaisons at the Dismounted Battle Lab and Chemical School to provide technical assistance as the process between the combat developers and materiel developers grows. In addition, a Battle Lab Cell was established to promote knowledge of mission requirements among the Enterprise, the Labs, and Schools. The Battle Lab Cell and on-site liaisons are conduits to leveraging the technology base, technology insertion possibilities, and product upgrades between the Center, the users, and industry. We also placed liaisons with key customers to ensure their current and developing requirements are understood and quickly communicated back to the Enterprise. Currently, liaisons are physically stationed with the Defense Nuclear Agency and the Office of the Assistant Secretary of the Army (Research, Development and Acquisition). An Enterprise Technical Liaison with the Office of the Secretary of Defense supports the U.S. Delegation to the Preparatory Commission.

The Edgewood Quarterly publication is used as a communication mechanism. It relates our efforts in support of our vision and values as well as programmatic information of interest to a wide range of suppliers and customers as well as our work force. There are over 600 external customers on distribution, and the document now reaches even more readers since it is available on the worldwide web. Recent issues devoted the lead portion of the publication to highlighting different Enterprise teams.

A systematic review of organizational performance against our objectives for customer satisfaction, high quality operational performance, and prevalence of behaviors consistent with our values,

initially completed by the Board in late 1992, is now completed annually. Needed changes in career development planning, matrix teaming procedures, and behavioral management training procedures were identified and initiatives developed to correct the shortfalls.

There were also some specialized inquiries (surveys) within individual segments of the Enterprise by process owners (Board members) to assess the effectiveness of their process and to identify areas needing improvement in their processes and leadership style.

A Quality and Productivity Self Assessment was conducted for the entire Research, Development, and Acquisition work force in July 1995 to establish a comprehensive baseline on our commitment to quality and productivity. We compared favorably with other Federal organizations' self-assessment results — we have a supportive work force that indicates it is ready to improve the quality and productivity of the organization. The Enterprise is a solid organization that is getting the job done. The staff recognizes this as well as the need for an effective quality improvement program. The capability and the will are present to take the entire organization to the next level.

The lack of formal union grievances is another way the Enterprise measures employee satisfaction. Since the reorganization in 1992, there have been no Unfair Labor Practices filed by the Union against management. Local 178, with positive support from management, has been successful in resolving all issues at the lowest level possible.

Our electronic forum, known as the **ZAPP** program, provides an open, anonymous media for feedback from virtually the entire work force, and it is used extensively to address problems, suggestions for improvement, dissatisfaction with management practices, and to provide positive comments with regard to management practices.